

CLAIMS

Claim 1 (original): A method of determining a time delay for a round-trip transmission of data comprising:

receiving a first data packet comprising a first IP source address, a first IP destination address, a first TCP source port, a first TCP destination port, and a first time stamp indicating a first time when the first data packet was transmitted;

inserting the first IP destination address as a second IP source address in a second data packet;

inserting the first IP source address as a second IP destination address in the second data packet;

inserting the first TCP destination port as a second TCP source port in the second data packet;

inserting the first TCP source port as a second TCP destination port in the second data packet;

inserting the first time stamp as a second time stamp in the second data packet; and
transmitting the second data packet.

Claim 2 (original): The method of claim 1 further comprising:

transmitting the first data packet at the first time;

receiving the second data packet at a second time; and

determining a difference between the first time in the second time stamp and the second time to establish the time delay for the round-trip transmission of data.

Claim 3 (original): The method of claim 1 further comprising:

validating the first IP destination address while receiving the first data packet, before inserting the first IP destination address, before inserting the first IP source address, before inserting the first TCP destination port, before inserting the first TCP source port, and before transmitting the second data packet; and

validating the first TCP destination port while receiving the first data packet, before inserting the first IP destination address, before inserting the first IP source address, before inserting the first TCP destination port, before inserting the first TCP source port, and before transmitting the second data packet.

Claim 4 (original): The method of claim 1 wherein:

inserting the first IP destination address occurs while transmitting the second data packet;
and

inserting the first IP source address occurs while transmitting the second data packet.

Claim 5 (original): The method of claim 1 wherein:

inserting the first TCP destination port occurs while transmitting the second data packet;
and

inserting the first TCP source port occurs while transmitting the second data packet.

Claim 6 (original): The method of claim 1 wherein:

inserting the first time stamp occurs while transmitting the second data packet.

Claim 7 (currently amended): The method of claim 1 further comprising:

providing the first data packet to further comprise a first IP checksum, a first TCP checksum, and a first CRC checksum;

validating the first IP checksum while receiving the first data packet;

validating the first TCP checksum while receiving the first data packet; and

validating the first CRC checksum.

Claim 8 (original): The method of claim 7 further comprising:

storing the first IP source address and the first IP destination address before validating the first IP checksum; and

storing the first TCP source port and the first TCP destination port after validating the first IP checksum and before validating the first TCP checksum.

Claim 9 (original): The method of claim 7 wherein:

validating the first TCP checksum occurs after validating the first IP checksum and before validating the first CRC checksum.

Claim 10 (original): The method of claim 7 wherein:

validating the first CRC checksum occurs after receiving the first data packet.

Claim 11 (original): The method of claim 7 further comprising:

determining a second IP checksum for the second data packet;

inserting the second IP checksum into the second data packet while transmitting the second data packet;

determining a second TCP checksum for the second data packet; and

inserting the second TCP checksum into the second data packet while transmitting the second data packet.

Claim 12 (original): The method of claim 11 wherein:

inserting the first IP destination address occurs while transmitting the second data packet;
inserting the first IP source address occurs while transmitting the second data packet;
inserting the first TCP destination port occurs while transmitting the second data packet;
inserting the first TCP source port occurs while transmitting the second data packet; and
inserting the first time stamp occurs while transmitting the second data packet.

Claim 13 (original): The method of claim 11 wherein:

inserting the first IP destination address occurs after inserting the second IP checksum;
inserting the first IP source address occurs after inserting the first IP destination address;
inserting the first TCP destination port occurs after inserting the first IP source address;

and

inserting the first TCP source port occurs after inserting the first TCP destination port and before inserting the second TCP checksum.

Claim 14 (original): The method of claim 1 further comprising:

providing the first data packet to further comprise a first data pattern; and
inserting a second data pattern into the second data packet.

Claim 15 (original): The method of claim 14 wherein:

inserting the second data pattern occurs while transmitting the second data packet.

Claim 16 (original): The method of claim 1 further comprising:

providing the first data packet to further comprise a first TCP flag; and

inserting the first TCP flag as a second TCP flag into the second data packet.

Claim 17 (original): The method of claim 16 further comprising:

validating the first TCP flag while receiving the first data packet, before inserting the first IP destination address, before inserting the first IP source address, before inserting the first TCP destination port, before inserting the first TCP source port, before transmitting the second data packet, and before inserting the first TCP flag.

Claim 18 (original): The method of claim 16 wherein:

inserting the second TCP flag occurs while transmitting the second data packet.

Claim 19 (original): The method of claim 1 further comprising:

providing the first data packet to further comprise two TCP flags;

inserting the two TCP flags into the second data packet;

inserting an additional TCP flag into the second data packet, the additional TCP flag having a value of one; and

inserting three additional TCP flags into the second data packet, the three additional TCP flags each having a value of zero

Claim 20 (original): The method of claim 1 further comprising:

providing the first data packet to further comprising six TCP flags;

inserting two of the six TCP flags into the second data packet;

inserting an additional TCP flag into the second data packet, the additional TCP flag having a value of one; and

inserting three additional TCP flags into the second data packet, the three additional TCP flags each having a value of zero.

Claim 21 (original): The method of claim 20 further comprising:

providing a FIN flag and a SYN flag for the two of the six TCP flags; and

providing an ACK flag for the additional TCP flag.

Claim 22 (original): The method of claim 1 further comprising:

providing the first data packet to further comprise a first IP checksum, first TCP flags, a first TCP checksum, and a first CRC checksum;

validating the first IP checksum while receiving the first data packet;

validating the first TCP checksum while receiving the first data packet;

validating the first CRC checksum after receiving the first data packet;

determining a second IP checksum for the second data packet;

inserting and the second IP checksum into the second data packet while transmitting the second data packet;

inserting the first TCP flags as second TCP flags into the second data packet while transmitting the second data packet;

determining a second TCP checksum for the second data packet;

inserting the second TCP checksum into the second data packet while transmitting the second data packet;

determining a second CRC checksum for the second data packet; and
inserting the second CRC checksum into the second data packet while transmitting the
second data packet.

Claim 23 (original): The method of claim 22 wherein:

inserting the first IP destination address occurs while transmitting the second data packet;
inserting the first IP source address occurs while transmitting the second data packet;
inserting the first TCP destination port occurs while transmitting the second data packet;
inserting the first TCP source port occurs while transmitting the second data packet; and
inserting the first time stamp occurs while transmitting the second data packet.

Claim 24 (original): The method of claim 23 wherein:

inserting the first IP destination address occurs after inserting the second IP checksum;
inserting the first IP source address occurs after inserting the first IP destination address;
inserting the first TCP destination port occurs after inserting the first IP source address;
inserting the first TCP source port occurs after inserting the first TCP destination port;
inserting the first TCP flags occurs after inserting the first TCP source port;
inserting the second TCP checksum occurs after inserting the first TCP flags;
inserting the first time stamp occur after inserting the second TCP checksum; and
inserting the second CRC checksum occurs after inserting the first time stamp.

Claim 25 (original): The method of claim 24 further comprising:

providing the first data packet to further comprise a first data pattern; and

inserting a second data pattern into the second data packet while transmitting the second data packet.

Claim 26 (original): The method of claim 25 further comprising:

transmitting the first data packet at the first time from a first electronic apparatus having the first IP source address and the first TCP source port;

receiving the second data packet at a second time and at the first electronic apparatus having the second IP destination address and the second TCP destination port; and

subtracting the first time in the second time stamp from the second time to determine the time delay for the round-trip transmission of data,

wherein:

receiving the first data packet further comprises receiving the first data packet at a second electronic apparatus having the first IP destination address and the first TCP destination port; and

transmitting the second data packet further comprises transmitting the second data packet from the second electronic apparatus having the second IP source address and the second TCP source port.

Claim 27 (original): The method of claim 22 wherein:

inserting the first IP destination address occurs after inserting the second IP checksum;

inserting the first IP source address occurs after inserting the first IP destination address;

inserting the first TCP destination port occurs after inserting the first IP source address;

inserting the first TCP source port occurs after inserting the first TCP destination port;

inserting the first TCP flags occurs after inserting the first TCP source port;
inserting the second TCP checksum occurs after inserting the first TCP flags;
inserting the first time stamp occur after inserting the second TCP checksum; and
inserting the second CRC checksum occurs after inserting the first time stamp.

Claim 28 (original): The method of claim 22 further comprising:

providing the first data packet to further comprise a first data pattern; and
inserting a second data pattern into the second data packet while transmitting the second data packet.

Claim 29 (original): The method of claim 22 further comprising:

transmitting the first data packet at the first time from a first electronic apparatus having the first IP source address and the first TCP source port;

receiving the second data packet at a second time and at the first electronic apparatus having the second IP destination address and the second TCP destination port; and

subtracting the first time in the second time stamp from the second time to determine the time delay for the round-trip transmission of data,

wherein:

receiving the first data packet further comprises receiving the first data packet at a second electronic apparatus having the first IP destination address and the first TCP destination port; and


transmitting the second data packet further comprises transmitting the second data packet from the second electronic apparatus having the second IP source address and the second TCP source port.

Claim 30 (original): The method of claim 1 further comprising:

waiting for the first data packet;
checking a status of a first memory portion;
storing a portion of the first data packet if the first memory portion is available, the portion of the first memory portion comprising the first IP source address, the first IP destination address, the first TCP source port, and the first TCP destination port;
checking a validity of the first data packet;
setting the status of the first memory portion to full if the first data packet is valid;
checking a status of a second memory portion;
transferring the portion of the first data packet from the first memory portion to the second memory portion if the second memory portion is available and if the first data packet is valid;
setting the status of the second memory portion to full; and
setting the status of the first memory portion to empty.

Claim 31 (currently amended): An electronic apparatus for determining a time delay for a round-trip transmission of data comprising:

~~a data reception portion;~~
~~an input memory portion coupled to the data reception portion;~~

 a data validity portion coupled to the data reception portion;
a first memory and data transfer management portion coupled to the input memory portion and the data validity portion;
a second memory and data transfer management portion coupled to the first memory and data transfer management portion;
an output memory portion for receiving a portion of an incoming data packet coupled to the input memory portion and the second memory and data transfer management portion;
a data pattern management portion for managing an insertion of a data pattern into an outgoing data packet by coupled to the second memory and data transfer management portion;
selecting a first source value, a first destination value and a first time stamp from the incoming data packet
setting a second source value to be the first destination value
setting a second destination value to be the first source value
setting a second time stamp to be the first time stamp
a header format portion for inserting the second source value, the second destination value and the second time stamp into the outgoing data packet. coupled to the output memory portion; and
a data transmission portion coupled to the header format portion and the data pattern management portion.

Claim 32 (currently amended): The electronic apparatus for determining a time delay for a round-trip transmission of data of claim 31 further comprising:

an incoming data portion comprising:

- ~~the~~ a data reception portion for receiving the incoming data packet;
- ~~the~~ an input memory portion for storing a portion of an incoming data packet;
- ~~the~~ a data validity portion for validating the incoming data packet; and
- ~~the first memory and data transfer management portion; and~~

an outgoing data portion comprising:

- ~~the second memory and data transfer management portion;~~
- the output memory portion;
- the data pattern management portion;
- the header format portion; and
- ~~the~~ a data transmission portion for transmitting the outgoing data packet.

Claim 33 (currently amended) The electronic apparatus for determining a time delay for a round-trip transmission of data of claim 31 wherein:

- the first source value comprises a TCP source port for the incoming data packet
- the first destination value comprises a TCP destination port for the incoming data packet
- the second source value comprises a TCP source port for the outgoing data packet
- the second destination value comprises a TCP destination port for the outgoing data
packet.

~~the input memory portion stores a portion of an incoming data packet;~~

the first and second memory and data transfer management portions manage a transfer of the portion of the incoming data packet from the input memory portion to the output memory portion;

the data validity portion validates the incoming data packet;

the output memory portion receives the portion of the incoming data packet from the input memory portion;

the data pattern management portion manages an insertion of a data pattern into an outgoing data packet; and

a header format portion inserts an IP source address, an IP destination address, a TCP source port, a TCP destination port, TCP flags, and a time stamp into the outgoing data packet.

Claim 34 (currently amended): The electronic apparatus for determining a time delay for a round-trip transmission of data of claim 31 wherein:

the input memory portion, the output memory portion, ~~the first and second memory and data transfer management portions, the data validity portion, the data reception portion, the data transmission portion,~~ the header format portion, and the data pattern management portion are located within a field-programmable gate array.

Claim 35 (currently amended): The electronic apparatus for determining a time delay for a round-trip transmission of data of claim 31 wherein further comprising:

the data pattern management portion is further for

selecting a first set of TCP flags from the incoming data packet

setting a second set of TCP flags to be the first set of TCP flags

the header format portion is further for inserting the second set of TCP flags into the outgoing data packet.

~~a data pattern memory portion coupling the data pattern management portion to the data transmission portion.~~

Claim 36 (currently amended): The electronic apparatus for determining a time delay for a round-trip transmission of data of claim 35 31 wherein:

the first source value comprises an IP source address for the incoming data packet

the first destination value comprises an IP destination address for the incoming data packet

the second source value comprises an IP source address for the outgoing data packet

the second destination value comprises an IP destination address for the outgoing data packet.

~~the data pattern memory portion is a dynamic random access memory.~~

Claim 37 (currently amended): The electronic apparatus for determining a time delay for a round-trip transmission of data of claim 36 31 wherein:

~~the input memory portion, the output memory portion, the first and second memory and data transfer management portions, the data validity portion, the data reception portion, the data transmission portion, the header format portion, and the data pattern management portion are located within a field programmable gate array.~~

Claim 38 (new): A method of determining a time delay for a round-trip transmission of data comprising:

receiving a first data packet, the first data packet comprising

a first source value

a first destination value

a first time stamp indicating a first time when the first data packet was transmitted

preparing a second data packet, the second data packet comprising

a second source value

a second destination value

a second time stamp

setting the first destination value as the second source value in the second data packet

setting the first source value as the second destination value in the second data packet

setting the first time stamp as the second time stamp in the second data packet

transmitting the second data packet.

Claim 39 (new): The method of determining a time delay for a round-trip transmission of data of claim 38 further comprising validating the first destination value before inserting the first destination value, before inserting the first source value, and before transmitting the second data packet

Claim 40 (new): The method of determining a time delay for a round-trip transmission of data of claim 38 further comprising:

transmitting the first data packet at a first time

receiving the second data packet at a second time

determining a difference between the first time in the second time stamp and the second time to establish the time delay for the round-trip transmission of data.

Claim 41 (new): The method of determining a time delay for a round-trip transmission of data of claim 38 wherein

inserting the first destination value occurs while transmitting the second data packet
inserting the first source value occurs while transmitting the second data packet.

Claim 42 (new): The method of determining a time delay for a round-trip transmission of data of claim 38 wherein inserting the first time stamp occurs while transmitting the second data packet.

Claim 43 (new): The method of determining a time delay for a round-trip transmission of data of claim 38 further comprising

providing the first data packet to further comprise a first data pattern
inserting a second data pattern into the second data packet.

Claim 44 (new): The method of determining a time delay for a round-trip transmission of data of claim 43 wherein inserting the second data pattern occurs while transmitting the second data packet.

Claim 45 (new): The method of determining a time delay for a round-trip transmission of data of claim 38, wherein in the providing step, the first data packet further comprises a first TCP flag, the method further comprising inserting the first TCP flag as a second TCP flag into the second data packet.

Claim 46 (new): An apparatus for determining a time delay for a round-trip transmission of data comprising:

means for receiving a first data packet, the first data packet comprising
a first source value

a first destination value

a first time stamp indicating a first time when the first data packet was transmitted

means for preparing a second data packet comprising a second source value, a second destination value, a second time stamp

means for inserting the first destination value as the second source value in the second data packet

means for inserting the first source value as the second destination value in the second data packet

means for inserting the first time stamp as the second time stamp in the second data packet

means for transmitting the second data packet.

Claim 47 (new): The apparatus for determining a time delay for a round-trip transmission of data of claim 46 further comprising:

means for transmitting the first data packet at a first time

means for receiving the second data packet at a second time

means for determining a difference between the first time in the second time stamp and the second time to establish the time delay for the round-trip transmission of data.

Claim 48 (new): The apparatus for determining a time delay for a round-trip transmission of data of claim 46 further comprising means for validating the first destination value while receiving the first data packet, before inserting the first destination value, before inserting the first source value, and before transmitting the second data packet

Claim 49 (new): The apparatus for determining a time delay for a round-trip transmission of data of claim 46 wherein

the means for inserting the first destination value operates concurrently with the means for transmitting the second data packet


the means for inserting the first source value operates concurrently with the means for transmitting the second data packet.

Claim 50 (new): The apparatus for determining a time delay for a round-trip transmission of data of claim 46 wherein the means for inserting the first time stamp operates concurrently with the means for transmitting the second data packet.

Claim 51 (new): The apparatus for determining a time delay for a round-trip transmission of data of claim 46, wherein the first data packet further comprises a first data pattern, the method further comprising means for inserting a second data pattern into the second data packet.

Claim 52 (new): The apparatus for determining a time delay for a round-trip transmission of data of claim 51 wherein the means for inserting the second data pattern operates concurrently with the means for transmitting the second data packet.

Claim 53 (new): The apparatus for determining a time delay for a round-trip transmission of data of claim 46, wherein the first data packet further comprises a first TCP flag, the apparatus further comprising means for inserting the first TCP flag as a second TCP flag into the second data packet.

 Claim 54 (new): The apparatus for determining a time delay for a round-trip transmission of data of claim 46 comprising a field programmable gate array.
